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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,826	10/30/2003	Young-Gun Ko	SAM-0449	9264

7590 07/27/2005

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EXAMINER

CRANE, SARA W

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/697,826	KO ET AL.	
	Examiner	Art Unit	
	Sara W. Crane	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-92 is/are pending in the application.
- 4a) Of the above claim(s) 1-26 and 47-71 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27-46 and 72-92 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>26 Nov. 2003</u> | 6) <input type="checkbox"/> Other: _____ |

210 Jan 2005

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 32-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

These claims should probably depend from claim 30, where the "second source/drain regions" are recited. (?)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 27-37, 41-43, 45-46, 72-83, 87-89, and 91-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama.

With respect to claim 27, figure 10 of Nishiyama teaches a MOS transistor having a gate dielectric 204, 208, on substrate 202, and gate electrode 216 on the gate dielectric. Layer 210, 212 is adjacent (or nearby) the gate dielectric layer at the lower portions of the gate electrode, and there are insulating spacers (part of layer 215) on layer 210, 212 at an upper side portion of the gate electrode. It would have been obvious to make layer 210, 212 as an epitaxial layer, because a selective epitaxial

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growth deposition process is taught (column 12, lines 32-35), in order to obtain the high quality crystallinity which would arise.

With respect to claim 28, layers 205, 208 wrap around the gate electrode. Doped regions form "first" source/drain regions at 210, 212, and "second" source/drain regions are below at 213, 214, extending into the substrate. The semiconductor is silicon (column 12, line 36). Silicon oxide would have been obvious for gate dielectric, because this is the most commonly used material for this purpose, and it must be either deposition or grown by oxidation. Conductive materials of claims 43 and 45-46 would have been obvious to increase the conductivity of a contact or electrode, and silicides as noted are in addition refractory.

Claims 38-40 and 84-86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama in view of Liu.

It would have been obvious to provide a recessed channel as shown in the cover figure of Liu in the Nishiyama device, in order to decouple shallow junctions, as noted in for example the Liu abstract. It would have been obvious to optimize the trench depth, consistent with other device dimensions, i.e., a small device would have small dimensions.

Claims 44 and 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama in view of Lee et al.

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An oxide sidewall buffer, such as Lee et al. 27 (column 3, line 55) would have been obvious for the Nishiyama device, in order to provide improved dielectric constant, or for enhanced isolation, in order to isolate the gate electrode from adjacent conductors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Crane, whose telephone number is (571) 272-1652.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sara W. Crane
Primary Examiner
Art Unit 2811